

Supplementary Online Materials

Supplemental Results

Individual Differences in the Association Between Subjective Stress and Heart Rate are Related
to Psychological and Physical Well-Being

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I. Coherence as the within-participant correlation between subjective stress and heart rate

As a comparison, within-participant correlations between self-reported stress and heart rate were also examined. Correlations were less robust to missing data so were only able to be computed for $N = 1019$ participants. We fit a linear mixed-effects model regressing the well-being indicator of interest on the within-participant correlation coefficients of self-reported stress and heart rate, adjusting for age (centered). It should be noted that this approach is suboptimal relative to the linear mixed effects model (LMEM) approach presented in the main text, as extracted correlation coefficients lose information on error associated with their estimation.

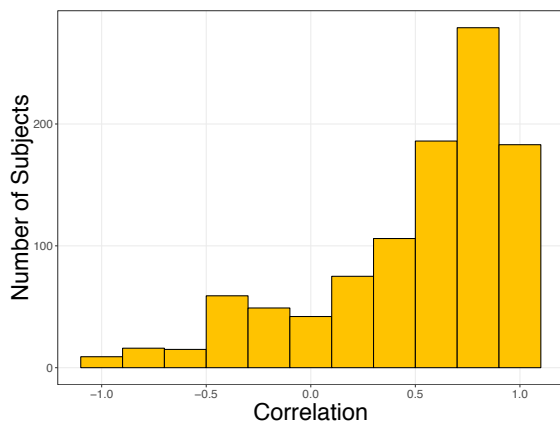


Figure S1. Distribution of within-participant associations between self-reported stress and heart rate across the sample, presented as correlation magnitudes (r).

Results

Well-being and individual differences in correlations between self-reported stress and heart rate

Within-participant correlations between self-reported stress and heart rate was examined in relation to multiple markers of psychological and physical well-being. Table S1 details primary results, with full model results included in Supplemental Method, R Markdown section I.

	<i>b</i>	<i>SE</i>	<i>F</i>	error <i>df</i>	<i>p</i>	<i>p-adjusted</i>
Psychological Well-Being						
PWB	10.795	2.283	22.27	1009.7	<.0001***	<.0001***
Depression	-2.749	0.530	26.76	991.5	<.0001***	<.0001***
Anxiety	-2.990	0.585	26.02	996.7	<.0001***	<.0001***
Physical Well-Being						
IL-6 (log2)	-0.252	0.069	13.15	1009.1	<.001**	<.001**
CRP (log10)	-0.046	0.034	1.87	992.3	0.172	0.172
Denial coping	-0.614	0.147	17.46	1007.5	<.0001***	<.0001***

Table S1. The relationships between the well-being indicators and the within-participant correlation coefficients for self-reported stress and heart rate. Age was included as a covariate in each model. ‘Estimate’ represents the effect between the within-participant self-reported stress and heart rate correlation and the well-being indicator. Note that error *df*, *F*, and *p* are approximated via the Kenward-Roger method.

***p* < .001. *** *p* < .0001

Psychological well-being.

Similar to results presented in the main text using the single-step LMEM, within-participant correlations between self-reported stress and heart rate were related to all three indicators of psychological well-being. Participants with larger correlation coefficients (representing stronger associations between stress and heart rate) also reported higher PWB, $b = 10.795$, $F(1, 1009.7) = 22.27$, $p < .0001$, fewer depressive symptoms, $b = -2.749$, $F(1, 991.5) = 26.76$, $p < .0001$, and lower trait anxiety, $b = -2.990$, $F(1, 996.7) = 26.02$, $p < .0001$.

Physical well-being.

Within-participant correlations between self-reported stress and heart rate were similarly related to IL-6. Larger correlation coefficients were associated with lower IL-6, $b = -.252$, $F(1, 1009.1) = 13.15$, $p < .001$. However, no significant relationship was found between within-participant stress-heart rate correlations and CRP, $b = -.046$, $F(1, 992.3) = 1.87$, $p = .17$.

Denial coping.

Within-participant correlations between self-reported stress and heart rate were also associated with denial coping, with larger correlations associated with less tendency towards the use of denial as a coping strategy, $b = -.614$, $F(1, 1007.5) = 17.46$, $p < .0001$.

Summary

Examining within-participant correlation coefficients as the measure of stress-heart rate coherence yielded similar results to the LMEM approach for psychological well-being, depression, anxiety, IL-6 and denial coping, but not CRP. There was no significant effect for CRP.

II. Lag between survey and stress induction studies

There was a lag of 0 to 62 months from the survey study to the stress-induction (biomarker) study of MIDUS II. The COPE and PWB were completed as part of the survey study. All other measures, including CES-D, STAI, blood collection for IL-6 and CRP were from the stress-induction study, which coincided with the heart rate and self-reported stress measurements during different phases of the stress-induction task which constitute the stress-heart rate coherence measure. We thus assessed whether this lag moderated results for PWB or denial coping, and also whether adjusting for this lag influenced results.

Lag did not significantly moderate results nor did adjusting for lag influence the significance of any findings. See Supplemental Method, R Markdown section III for full model results.

III. PWB subscales

Exploratory analyses investigated the relationship between stress-heart rate coherence and the six different subscales of the PWB. We fit the same LMEM model as described in the main text for each of the six subscales. All subscales of the PWB were significantly associated with stress-heart rate coherence (Table S2). Full model results included in Supplemental Method, R Markdown section IV.

	<i>b</i>	<i>SE</i>	<i>F</i>	error <i>df</i>	<i>p</i>
Autonomy	0.011	0.005	4.29	831.0	0.039
Environmental Mastery	0.022	0.004	23.97	825.2	0.0001***
Personal Growth	0.018	0.005	13.80	821.1	<.001**
Positive Relations with Others	0.023	0.005	23.05	802.1	<.0001***
Purpose in Life	0.022	0.005	19.38	836.9	<.0001***
Self-Acceptance	0.019	0.004	21.89	800.4	<.0001***

Table S2. Relationships between coherence and each of the six subscales of PWB.

p < .001. * p < .0001